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BANGALORE WATER SUPPLY AND SEWERAGE BOARD

6th Floor, Cauvery Bhavan,
K.G. Road, Bangalore 560009

Improvement work of Design, Construction, Supply, Erection and Commissioning 1 MLD UF, Solar Pannel & UV Disinfection at 20 MLD UWTP at Horamavu under JHA funds coming under AEE(WWM-STP-H&A.V-1) Sub-div.

(Through Karnataka Procurement Portal only)

https://www.kppp.karnataka.gov.in

Office of the Chief Engineer (Waste Water Management-West)
BANGALORE WATER SUPPLY & SEWERAGE BOARD
6th Floor, Cauvery Bhavan,
K.G. Road, Bangalore 560009
Telephone – 080-22945350

TENDER REFERENCE :	:	No.: BWSSB/CE(WWM-W)/ACE(WWM-P-W)/DCE(WW

		M-E&W)/TA-2/ 296 /2025-26 Dated: 26.05.2025
NAME OF THE WORK	:	Improvement work of Design, Construction, Supply, Erection and Commissioning 1 MLD UF, Solar Pannel & UV Disinfection at 20 MLD UWTP at Horamavu under JHA funds coming under AEE(WWM-STP-H&A.V-1) Sub-div.
LAST DATE AND TIME FOR RECEIPT OF TENDERS	:	10-06 -2025 16:00hrs
TIME AND DATE OF OPENING OF TECHNICAL TENDERS	:	11-06-2025 17:00hrs
PLACE OF OPENING OF TECHINCAL TENDERS	:	Office of The Chief Engineer (Waste Water Management-West) Bangalore Water Supply & Sewerage Board 6th Floor, Cauvery Bhavan, K.G. Road, Bangalore 560009
TIME AND DATE OF OPENING OF PRICE TENDERS	:	Will be intimated to the qualified tenderers
PLACE OF OPENING OF PRICE TENDER	:	Will be intimated to the qualified tenderers
ADDRESS FOR COMMUNICATION	:	Office of The Chief Engineer (Waste Water Management-West) Bangalore Water Supply & Sewerage Board 6th Floor, Cauvery Bhavan, K.G. Road, Bangalore 560 009

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD
Office of The Chief Engineer (Waste Water Management-West)
6th Floor, Cauvery Bhavan, K.G. Road, Bangalore-560009

INVITATION FOR TENDER

(ONLY THROUGH KARNATAKA PROCUREMENT PORTAL)

IFT No.: BWSSB/CE (WWM-W)/ACE(WWM-STP-W)/DCE(WWM-E&W)/TA-2/296/2025-26 Dt: 26.05.2025.

SECTION 1
INVITATION FOR TENDER

The Chief Engineer (Waste Water Management-West) invites tenders from eligible tenderers for **: Improvement work of Design, Construction, Supply, Erection and Commissioning 1 MLD UF, Solar Pannel & UV Disinfection at 20 MLD UWTP at Horamavu under JHA funds coming under AEE(WWM-STP-H&A.V-1) Sub-div** detailed in the table below. Tenderers are requested to submit their tender, EMD and details of their capability to undertake the tender (as detailed in ITT Clause-3 & 6) in the Karnataka Public Procurement Portal. Price tender will be opened only if the Tenderer is found to be qualified to execute the tendered works. Tenderers are advised to note the minimum qualification criteria specified in clause 3 of the Instructions to Tenderers to qualify for award of the contract.

1. Tender documents may be downloaded through Karnataka Procurement Portal www.kppp.karnataka.gov.in website only from 27**-05-2025 to 10-06-2025**. Interested Tenderers may obtain further information by accessing the same website.
2. Tenders must be accompanied by Earnest Money Deposit specified for the work in the Table below. EMD will have to be in any one of the forms as specified in the Tender document and shall have to be valid for **45** days beyond the validity of the tender.
3. The last date and time for receipt of tenders in the Electronic Tender Box in website (www.kppp.karnataka.gov.in) is 10.06-2025 up to 16.00 hrs. The technical bids will be opened on 11.06-2025 at 17:00hrs. If the bid-opening day remains as public holiday, bids will be opened on the next working day at the original stipulated time.

4. Other details can be seen in the tender documents

Sl. No	Name of the work	Tender processing fee	Amount put to tender Rs.	Bid security Rs. (EMD)	Period of completion	Eligibility criteria during last 5 years (2020-21 , 2021-22,2022-23, 2023-24 & 2024-25)

<table>
<tr><td></td><td></td><td></td><td>(approx)</td><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>Financial Turnover (in all classes of Civil Engg. Construction works) for any of the two years during the last five years Rs.</td><td>Performance and work Qualification</td></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td><td>(5)</td><td>(6)</td><td>(7)</td><td>(8)</td></tr>
<tr><td></td><td>Improvement work of Design, Construction, Supply, Erection and Commissioning 1 MLD UF, Solar Pannel & UV Disinfection at 20 MLD UWTP at Horamavu under JHA funds coming under AEE(W</td><td>As per KPP portal.</td><td>338.10 lakh (excluding GST@ 18%)</td><td>5.07 Lakhs</td><td>09 months Including Monsoon</td><td>Rs. 797.92 lakhs</td><td>1) As a prime contractor, the tenderer should have satisfactorily completed at least one similar nature of upgradation of Sewage Treatment Plant / Design and Construction of New Sewage Treatment Plant including PLC/SCADA/CMMS of value not less than Rs.199.48 lakh in the last five financial years 2020-21 to 2024-25
2) The tenderer should have executed in any one financial year, a minimum quantity of :
a. 1 MLD of Sewage Treatment plant / Tertiary Treatment Plant with Ultra filteration /Membrane Bio Reactor/ Nano Filteration meeting the following Parameters
<table>
<tr><td>pH-instantaneous range</td><td></td><td>7.0-8.5</td></tr>
<tr><td>BODs at 20°C</td><td>mg/L</td><td>5</td></tr>
<tr><td>COD</td><td>mg/L</td><td>50</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>5</td></tr>
<tr><td>N Total</td><td>mg/L</td><td>10</td></tr>
<tr><td>Total Phosphorous</td><td>mg/L</td><td>1</td></tr>
</table></td></tr>
</table>

	WM-STP-H&A.V-1) Sub-div						<table><tr><td>Fecal Coliform</td><td>MPN/ 100mL</td><td>BDL</td></tr></table> 3)Each tender should further demonstrate: i) Assessed available tender capacity = (A*N*1.5 - B)>= Rs. **398.96** lakhs(amount put to tender including GST @18%) 4)Liquid assets and /or availability of credit facilities of not less than **Rs.132.99 lakhs** (Credit lines /letter of credit / certificates from Nationalized/ Schedule banks in India for meeting the fund requirement etc.,

NOTE: 1.a The amount put to tender Rs.338.10 Lakh is Excluding GST at 18% and the bidder should quote for the amount.

b.The GST amount is of Rs.60.86 Lakhs

2.The financial bid evaluation will be based on 1(a) of above Note

5. EMD shall be paid through OTC, NEFT, DEBIT CARD & CREDIT CARD through Karnataka Public Procurement Portal Only. The value of the Bid Security / EMD is as mentioned in the table above in column no 5.
6. Tenderers can access tender documents from www.kppp.karnataka.gov.in website only and upload the required details; those are mentioned in different sections in the bid document in to electronic tender on the website. Scanned documents those are required to be furnished as per Section 2, 3 & 4 of the bid document shall be submitted through Karnataka Public Procurement Portal.
7. The Tender processing fee once paid will not be refunded.
8. The successful Tenderer would be required to furnish the performance Bank Guarantee from a Nationalized / Scheduled Indian Bank, with jurisdiction at Bangalore as specified, towards guarantee for completion of work within the stipulated period as mentioned in tender document.
9. Applications / requisitions from joint venture Firms are not acceptable.
10. Bangalore Water Supply and Sewerage Board (BWSSB) reserves the right to cancel or annul the entire or part of this process of invitation at any time without assigning any reasons.
11. For any additional information regarding the above tender, the firms who are interested to quote, may contact office of the undersigned at the office address given below on all working days during office hours (10:30hours to 17:00 hours).

Bangalore Water Supply & Sewerage Board

12. Tenderers shall submit offers that comply with the requirements of the bid document.

13. Successful Bidder has to follow the SWD (Solid Waste Management Rules 2016) in this tender work.

Corrigendum / Modification / Corrections, if any will be published in the website only.

Sd/-

Chief Engineer
(Waste Water
Management-West)

SECTION 2:

INSTRUCTIONS TO TENDERERS (ITT)

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A. General

1. Scope of Tender

1.1 The **Chief Engineer (WWM-West),** (Referred to as Employer in these documents) invites tenders following Two Stage Karnataka Public Procurement Portal procedure, from eligible Tenderers, **Improvement work of Design, Construction, Supply, Erection and Commissioning 1 MLD UF, Solar Pannel & UV Disinfection at 20 MLD UWTP at Horamavu under JHA funds coming under AEE(WWM-STP-H&A.V-1) Sub-div(**as defined in these documents and referred to as "the work") detailed in the Table given in the Invitation for Tenders (IFT).

2. Eligible Tenderers

2.1 Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Karnataka

2.2 Tenders from Joint ventures are not acceptable.

3. Qualification of the Tenderer:

3.1 All Tenderers shall provide the requested information accurately and in sufficient
detail in Section 3: Qualification information.

3.2 To qualify for award of this contract, each Tenderer in its name should have in the
last five years i.e. (2020-21 to 2024-25)

i. Should have achieved in at least two financial years a minimum financial turnover (in all classes of civil engineering construction works only) of **Rs.797.92 lakh.**

ii. As a prime contractor, the tenderer should have satisfactorily completed at least one similar nature of upgradation of Sewage Treatment Plant / Design and Construction of New Sewage Treatment Plant including PLC/SCADA/CMMS of value not less than **Rs.199.48 lakh** in the last five financial years 2020-21 to 2024-25.

iii. The tenderer should have executed in any one financial year, a minimum quantity of

a. 1 MLD of Sewage Treatment plant / Tertiary Treatment Plant with Ultra filteration /Membrane Bio Reactor/ Nano Filteration meeting the following Parameters

pH-instantaneous range		7.0-8.5
BODs at 20°C	mg/L	5
COD	mg/L	50
TSS	mg/L	5

N Total	mg/L	10
Total Phosphorous	mg/L	1
Fecal Coliform	MPN/ 100mL	BDL

3.3 Each Tenderer should further demonstrate:

b. Liquid assets and /or availability of credit facilities of not less than **Rs.132.99 lakhs.**(Credit lines/letter of credit/certificates from Nationalised / Schedule banks in India for meeting the fund requirement etc.,

3.4 To qualify for a package of contracts made up of this and other contracts for which tenders are invited in this IFT, the tenderer must demonstrate having experience and resources to meet the aggregate of the qualifying criteria for the individual contracts.

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3.5 Sub-contractors experience and resources shall not be taken into account in determining the Tenderers compliance with the qualifying criteria except to the extent stated in 3.2 above.

3.6 Tenderers who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than the total tender value. The available tender capacity will be calculated as under:

a) **Assessed available tender capacity = (A*N*1.5 - B)>= 398.96 Lakhs (Amount put to tender including GST@18%)**

where

A = Maximum value of civil engineering works executed in any one year during the last five years (updated to 2025-26 price level at 10% per year) taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which tenders are invited.

B = Value, at 2025-26 price level, of existing commitments and on-going works to be completed during the next **09 months.**

Note: The statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent.

3.7 Even though the Tenderers meet the above criteria, they are subject to be disqualified if they have:

- made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or

- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
- participated in the previous Tender for the same work and had quoted unreasonably high tender prices and could not furnish rational justification.

3.8 All the Electromechanical equipment should be compatible with the existing system. The manufacturer should be an approved vendor of BWSSB. Also, prior approval (Drawings & QAP) is required for each equipment from the BWSSB.

3.9 Factory inspection is mandatory for all the equipments and the performance test to be conducted at the factory and at site after commissioning. The contractor is responsible for making all the arrangements for the inspection.

4. One Tender per Tenderer:

4.1 Each tenderer shall submit only one tender for one package. A tenderer who submits or participates in more than one tender (other than as a sub-contractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Tenderer's participation to be disqualified.

5. Cost of Tendering:

5.1 The tenderer shall bear all costs associated with the preparation and submission of his tender, and the Employer will in no case be responsible and liable for those costs.

6. Site visit:

6.1 The Tenderer at his own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Tenderers own expense.

B. Tender documents

7. Content of Tender documents

7.1 The set of tender documents shall have all the Sections given in Page 2:

7.2 Both the sets should be completed and uploaded with the tender.

8. Clarification of Tender Documents

8.1 A prospective tenderer requiring any clarification of the tender documents may notify the Employer by posting in the web site (Karnataka public procurement→My tenders→action→queries). No identity of the participating tenderer shall be mentioned in the query. All queries & replies can be viewed by all participating tenderers.

8.2 Pre-tender meeting: ***Deleted***

9. Amendment of Tender documents

9.1 Before the deadline for submission of tenders, the Employer may modify the tender documents by issuing addenda.

9.2 Any addendum thus issued shall be part of the tender documents and shall be posted in the Karnataka public procurement portal website for viewing by all the purchasers of the tender documents.

9.3 To give prospective Tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend as necessary the deadline for submission of tenders, in accordance with Sub-Clause 16.2 below.

C. Preparation of Tenders

10. Documents comprising the Tender

10.1.1 The tender submitted in Karnataka Public Procurement Portal by the Tenderer shall contain the documents as follows:

a) Scanned copy of Earnest Money Deposit.
b) The form of Tender (in the format indicated in Section 4)
c) Scanned copies of the certificates supporting the Qualification as in Section 3. Any other materials required to be completed and submitted by Tenderers in accordance with these instructions. The documents listed under Sections 3, 4, 6 and 9 shall be filled in without exception. PHOTOCOPIES OF THE DOCUMENTS SHOULD BE NOTARISED.

10.1.2 Rates for the Bill of Quantities (Section 9) shall be quoted at the provision made in the Karnataka Public procurement website Portal.

10.2 Tenderers submitting tenders together with other contracts stated in the IFT to form a package will so indicate in the tender together with any discounts offered for the award of more than one contract.

11. Tender prices

11.1 The contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Tenderer.

11.2 The Tenderer shall fill in the unit rates in figures for all items of the Works described in the Bill of Quantities. The system will automatically calculate the amount of that item as well as the total Tender value. ***Items for which no rate is entered by the Tenderer will not be paid for by the Employer when executed and shall be deemed covered by the other rates in the Bill of Quantities***

11.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Tenderer.

11.4 DELETED

12. Tender validity

12.1 Tenders shall remain valid for a period not less than **ninety days** after the deadline date for tender submission specified in Clause 16. A tender valid for a shorter period shall be rejected by the Employer as non-responsive.

12.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the Tenderers may extend the period of validity for a specified additional period. The request and the Tenderers responses shall be made in writing or e-mail. A Tenderer may refuse the

request without forfeiting his earnest money deposit. A Tenderer agreeing to the request will not be required or permitted to modify his tender, but will be required to extend the validity of his earnest money deposit for a period of the extension, and in compliance with Clause13 in all respects.

13. Earnest money deposit

13.1 Earnest Money Deposit shall be paid through Karnataka Procurement Portal only using any of the following four modes.

i. Credit Card (Online Payment)
ii. Direct Debit Using Internet Banking (Online Payment)
iii. Remittance at the Bank Counter - Challan (Offline Payment)
iv. NEFT (Offline payment).

13.2 Instruments having fixed validity issued as earnest money deposit for the tender shall be valid for 45 days beyond the validity of the tender.

13.3 Any tender not accompanied by an acceptable earnest money deposit and not secured as indicated in Sub-Clauses 13.1 and 13.2 above shall be rejected by the Employer as non-responsive.

13.4 The earnest money deposit of unsuccessful Tenderers will be returned within 30 days of the end of the tender validity period specified in Sub-Clause 12.1.

13.5 The earnest money deposit of the successful Tenderer will be discharged when the Tenderer has signed the Agreement and furnished the required Performance Security.

13.6 The Earnest money deposit may be forfeited:

a) if the Tenderer withdraws the Tender after tender opening during the period of tender validity;
b) if the Tenderer does not accept the correction of the Tender Price, pursuant to Clause 24; or
c) in the case of a successful Tenderer, if the Tenderer fails within the specified time limit to
   (i) Sign the Agreement; or
   (ii) Furnish the required Security deposit

14. Format and signing of Tender

14.1 The completed tender comprising of documents indicated in ITT 10, should be uploaded in the Karnataka Public Procurement Portal website along with scanned copies of requisite certificates those are mentioned in different sections in the bid document and scanned copy of tender Security / EMD.

14.2 All the documents should be uploaded in Karnataka Public Procurement website. Tenderer should take a print out of the Form of Tender in the Section 4 of the tender document on company letter head and should sign, stamp and upload the same to the tender. Authenticity of the singing authority shall be furnished. With this, it is taken that tenderer has signed & submitted the tender.

14.3 The Tender shall contain no alterations or additions, except those to comply with instructions issued by the Employer.

D. Submission of Tenders

15. Up-loading & submission of tenders

15.1 The tenders should be uploaded only through Karnataka Public Procurement Website. Tender should contain

A. Technical Tender consisting of following:

a. All the documents with required details in prescribed format; those are mentioned in different sections in the Tender. Form of Tender, etc., shall be downloaded, filled with required details, signed, scanned & uploaded to the Karnataka Public Procurement Portal (www.kppp.karnataka.gov.in)

b. The above documents along with notarized copies of documentary evidences as indicated in Section—2 of ITT, Section-3 Qualification information & Section-4 Forms of Tender shall be scanned and uploaded to the website compulsorily, failing which tender will be rejected in view of incomplete tender document and

B. Financial Tender consisting of Bill of Quantities

15.1 All rates for the items in the Schedule shall be posted in the work template provided in the tender document. Rates shall be entered in figures only.

15.2 DELETED

15.3 BID reference Number will be automatically generated by the server.

15.4 DELETED

16. Deadline for submission of the Tenders

16.1 DELETED.

16.2 The Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Clause 9, in which case all rights and obligations of the Employer and the Tenderers previously subject to the original deadline will then be subject to the new deadline.

17. Late Tenders

17.1 The software of Karnataka Public Procurement website system will not allow the Tenderer to upload the documents after expiration of the stipulated date & time of Bid submission. The Tenderer shall refer the server time, which will be displayed in the Karnataka Public Procurement Portal. BWSSB will not be responsible for non-receipt of bids on the stipulated date & time prescribed in clause 16, due to Internet Problems, improper uploading or any other related problems. In case of connectivity problems, Tenderer may contact Helpdesk of the Karnataka Public Procurement Portal service provider and may also draw the attention of tender inviting authority.

18. Modification and Withdrawal of Tenders

18.1 Tenderers may “modify” and “withdraw” their tenders multiple numbers of times, until the deadline for submission of tenders by operating the relevant provision made in Karnataka Public Procurement Portal. If the Tenderer withdraws the tender before the deadline for submission of tenders and later if he is interested to submit the tender once again, may do so within the stipulated date & time as mentioned in Clause 16. In this case within the stipulated date & time, the tenderer can once again submit the requisition to the officer inviting tenders for access to the withdrawn tender document for resubmission. For this tenderer need not make any additional payment towards the cost of tender document. Communication of modification / withdrawal by other means will not be accepted.

18.2 DELETED

18.3 No Tender may be modified after the deadline for submission of Tenders.

18.4 Withdrawal or modification of a Tender between the deadline for submission of Tenders and the expiration of the original period of Tender validity specified in Clause 12.1 above or as extended pursuant to Clause 12.2 may result in the forfeiture of the earnest money deposit pursuant to Clause 13.

18.5 DELETED

E. Tender opening and evaluation

19. Opening of Technical Bid of Tenders and evaluation to determine qualified Tenderers:

19.1 The Employer will open the Technical details of all the Tenders received (except those withdrawn), including modifications made pursuant to Clause 18, in the presence of the Tenderers or their representatives who choose to attend at the Employer’s office mentioned in the earlier para at 15:00 hours on the date and the place specified. In the event of the specified date of Tender opening being declared a holiday for the Employer, the Tenders will be opened at the appointed time and location on the next working day.

19.2 WITHDRAWAL proposal submitted pursuant to clause 18 shall be read out first and their bids shall not be opened.

19.3 The Tenderers names, the presence or absence of earnest money deposit (amount, format and validity), the submission of qualification information and such other information as the Employer may consider appropriate will be announced by the Employer at the opening.

19.4 The Employer shall prepare minutes of the Tender opening, including the information disclosed to those present in accordance with Sub-Clause 19.3.

19.5 The Price Tenders of all the Tenderers including modifications for financial tenders cannot be opened as this is programmed to open later after evaluation of the Technical details of the participating Tenderers.

19.6 The Employer will evaluate and determine whether each tender (a) meets the eligibility criteria defined in ITT Clause 2; (b) is accompanied by the required earnest money deposit as per stipulations in ITT Clause and (c) meets the minimum qualification criteria stipulated in ITT Clause 3. The Employer will draw out a list of qualified Tenderers.

20. Opening of Financial Bid of qualified Tenderers and evaluation:

20.1 The Employer will inform all the Qualified Tenderers the time, date and venue fixed for the opening of the price Tenders. The Employer will open the price tender of Qualified Tenderers at the appointed time and date in the presence of the Tenders or their representatives who choose to attend. In the event of the specified date of Price tender opening being declared a holiday for the Employer, the price tenders will be opened at the appointed time and location on the next working day.

20.2 DELETED

20.3 The Tenderers' names, the Tender prices, the total amount of each Tender, any discounts, and withdrawals, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. No Tender shall be rejected at Tender opening.

20.4 The Employer shall prepare minutes of the Price Tender opening, including the information disclosed to those present in accordance with Sub-Clause 20.3.

21. Process to be confidential

21.1 Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any effort by a Tenderer to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender.

22. Clarification of Tenders

22.1 To assist in the examination, evaluation, and comparison of Tenders, the Employer may, at his discretion, ask any Tenderer for clarification of his Tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing but no change in the price or substance of the Tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders in accordance with Clause 24.

22.2 Subject to sub-clause 22.1, no Tenderer shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded. If the Tenderer wishes to bring additional information to the notice of the Employer, it should do so in writing.

22.3 Any effort by the Tenderer to influence the Employer in the Employer's Tender evaluation, Tender comparison or contract award decisions may result in the rejection of the Tenderers' Tender.

23. Examination of Tenders and determination of responsiveness

23.1 Prior to the detailed evaluation of Tenders, the Employer will determine whether each Tender; (a) has been properly signed; and; (b) is substantially responsive to the requirements of the Tender documents like (a)Form of Tender, (b)Declaration statement Scanned/ uploaded [including documents those are required to be furnished as per Section 2, 3 & 4 of the tender,]; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the tendering documents.

23.2 A substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender documents, the Employer's rights or the Tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders.

23.3 If a Tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non conforming deviation or reservation.

24. Correction of errors

24.1 Once the Tenderer key in the rates in figures, in the Bill of quantities provided, the system will automatically calculate the amount of that item as well as the total Bid value.

24.2 Deleted

25. Evaluation and comparison of Tenders

25.1 The Employer will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Clause 23.

25.2 In evaluating the Tenders, the Employer will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:

(a) Making any correction for errors pursuant to Clause 24; and

(b) DELETED

25.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Tender evaluation.

25.4 DELETED

25.5 If the tender of the successful tenderer is seriously unbalanced in relation to the Employer’s estimate of the cost of the work to be performed under the contract, the Employer may require the Tenderer to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 29 be increased at the expense of the successful Tenderer to a level sufficient to protect the Employer against financial loss in the event of default of the successful under the contract.

F. Award of Contract

26. Award criteria

26.1 Subject to Clause 27, the Employer will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price, provided that such Tenderer has been determined to be (a) eligible in accordance with the provisions of Clause 2, and (b) qualified in accordance with the provisions of Clause 3.

27. Employer's right to accept any Tender and to reject any or all Tenders

27.1 Not with standing Clause 26, the Employer reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the Employer's action.

28. Notification of award and signing of Agreement

28.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period by writing, e-mail or by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

28.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of Security deposit in accordance with the provisions of Clause 29.

28.3 The Agreement will incorporate all agreements between the Employer and the successful Tenderer. It will be kept ready for signature of the successful Tenderer in the office of Employer within 30 days following the notification of award along with the Letter of Acceptance. Within 20 days of receipt, the successful Tenderer will sign the Agreement and deliver it to the Employer.

28.4 Upon the furnishing by the successful Tenderer of the Performance Security, the Employer will promptly notify the other Tenderers that their Tenders have been unsuccessful.

29. Security deposit

29.1 Within 20 days of receipt of the Letter of Acceptance, the successful Tenderer shall deliver to the Employer a Security deposit in any of the forms given below for an amount equivalent to 5% of the Contract price plus additional security for unbalanced tenders in accordance with Clause 25.5 of ITT and Clause 44 of the Conditions of Contract. :

- A bank guarantee in the form given in Section 10;

29.2 If the security deposit is provided by the successful Tenderer in the form of a Bank Guarantee, it shall be issued either by a Nationalized/Scheduled bank and valid in accordance with Clause 43 of Condition of Contract.

29.3 DELETED

29.4 Failure of the successful Tenderer to comply with the requirements of Sub-Clause 29.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Earnest money deposit.

30. DELETED

31. Corrupt or Fraudulent practices

31.1 The GOK requires that the Tenderers/Suppliers/Contractors, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, GOK :

a) will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

b) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a GOK contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a GOK contract.

31.2 Furthermore, Tenderers shall be aware of the provision stated in sub-clause 50.2 of the Conditions of Contract.

Sd/-

Chief Engineer (Waste Water Management-West)

SECTION 3:

QUALIFICATION INFORMATION

The following form is to be downloaded, particulars are to be filled, scanned & uploaded by the Tenderer.

The information to be filled in by the Tenderer hereunder will be used for purposes of computing Tender capacity as provided for in Clause 3 of the Instructions to Tenderers. This information will not be incorporated in the Contract.

1.1 Constitution or legal status of Tenderer [Attach copy]
Place of Registration _____
(Attach Copy)
Principal place of business: _____

1.2 Total value of civil engineering construction works executed and payments received in the last five years (in **Rs** Lakh)[attach certificate of Chartered accountant]

2020 – 21
2021– 22
2022– 23
2023 - 24
2024- 25

1.3 Work performed as Prime Contractor (in the same name) on works of similar nature over during the five years specified in 1.2 above.

Project Name	Name of Employer	Description of Work	Contract Number	Value of contract Rs. Lakh	Date of issue of work order	Specified period of completion	Actual date of completion	Remarks explaining reasons for delay in completion of work
1	2	3	4	5	6	7	8	9

1.4 Quantities of work executed as prime contractor (in the same name) during the last five years specified in 1.2 above: [to support the qualification criteria in ITT clause 3]

Year	Name of Work	Name of Employer	Quantity of work performed (cum)		Remarks (Indicate contract reference)

1.5 Information on works for which Tenders have been submitted and works which are yet to be completed as on the date of this Tender.

(A) Existing commitments and on-going works:

Description of Work	Place & State	Contract No. & Date	Name and Address of Employer	Value of Contract (Rs. Lakh)	Stipulated period of completion	Value of works remaining to be completed (Rs. Lakh)	Anticipated date of completion
1	2	3	4	5	6	7	8

(B) Works for which Tenders already submitted:

Description of Work	Place & State	Name and Address of Employer	Estimated value of works (Rs. Lakh)	Stipulated Date period of completion	when decision is expected	Remarks if any
1	2	3	4	5	6	7

1.6 Items of equipment essential for carrying out the works.

Item of Equipment	Requirement			Owned and available		Remarks
	No.	Capacity	Owned	Number/ Capacity	Age/ Condition	

1.7 Reports on the financial standing of the tenderer, such as profit and loss statements and auditor’s reports for the last five years;

1.8 Qualification and experience of the key technical and management personnel in permanent employment with the tenderer and those that are proposed to be deployed on this contract, if awarded.

1.9. Name, address, and telephone, telex, and fax numbers of the Tenderers' bankers who may provide references if contacted by the Employer.

1.10 Evidence of access to financial resources to meet the qualification requirement specified in ITT Clause3.3 (b): Cash in hand, Letter of Credit etc. List them below and attach certificate from the Banker in the suggested format as under:

BANKER'S CERTIFICATE

This is to certify that M/s. ..... is a reputed company with a good financial standing. If the contract for this work, namely ..... (name of the work) is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. ..... to meet the working capital requirements for executing the above contract

Sd/-
Name of the Bank, Senior Bank Manger
Address:
.....

1.11 Proposals for subcontracting components of works amounting to more than 20% of the contract price .

Item of Work	Value of Sub-Contract	Identified Sub-Contractor (Name and address)	Experience of similar work

1.12 Information on litigations in which the Tenderer is involved:

Other Party (ies)	Employer	Details of dispute	Amount involved	Remarks showing present status

1.13 The proposed methodology and program of construction, backed with equipment planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.

Sd/-

Chief Engineer

(Waste Water Management-West)

SECTION 4:

[Tenderer shall down load this page, print on the letter head, fill the gaps with signature, scan the sheet & upload to the website. Failing which the tender will be treated as non-responsive]

FORMS OF TENDER, LETTER OF ACEPTANCE, NOTICE TO PROCEED WITH THE WORK AND AGREEMENT FORM

Form of Tender

Description of the Work: **Improvement work of Design, Construction, Supply, Erection and Commissioning 1 MLD UF, Solar Pannel & UV Disinfection at 20 MLD UWTP at Horamavu under JHA funds coming under AEE(WWM-STP-H&A.V-1) Sub-div.**

To

The Chief Engineer (Waste Water Management-West)
Bangalore Water Supply & Sewerage Board
6th Floor, Cauvery Bhavan D-Block,
K.G. Road, Bangalore 560009

GENTLEMEN,

We offer to execute the Works described above in accordance with the Conditions of Contract accompanying this Tender for the Contract Price uploaded for this tender to be opened after qualification.

This Tender and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Tender you receive.

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely “Prevention of Corruption Act 1988”.

We hereby confirm that this Tender complies with the Tender validity and Earnest money deposit required by the Tender documents.

We attach herewith our current income-tax clearance certificate.

Yours faithfully,
Authorized Signature:
Name & Title of Signatory:

_____
Name of Tenderer _____
Address: ----------

Letter of Acceptance
(letterhead paper of the Employer)

_____[date]

To:
_____[name and address of the Contractor]

Dear Sirs,

This is to notify you that your Tender dated _____ for execution of the _____[name of the contract and identification number, as given in the Instructions to Tenderers] for the Contract Price of Rupees _____ —— _____ (_____) [amount in words and figures], as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by our Agency.

You are hereby requested to furnish Security deposit plus additional security for unbalanced tenders in terms of Clause 25.5 of ITT, in the form detailed in Clause 29.1 of ITT for an amount of Rs.————— within 20 days of the receipt of this letter of acceptance valid up to 30 days from the date of expiry of Defects Liability Period i.e. up to ..... and sign the contract, failing which action as stated in Para 29.4 of ITT will be taken.

Yours faithfully,

Authorized Signature
Name and Title of Signatory
Name of Agency

Issue of Notice to proceed with the work

(letterhead of the Employer)

————— (date)

To
————————————————— (name and address of the Contractor)
—————————————————
—————————————————

Dear Sirs:

Pursuant to your furnishing the requisite security deposit as stipulated in ITT Clause 29.1 and signing of the contract agreement for the construction of ———————[name of the contract] a Tender Price of Rs.———————, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory authorized to sign on behalf of Employer)

Agreement Form
Agreement

This agreement, made the _____day of _____20_____, between_____ _____[name and address of Employer] (hereinafter called "the Employer") of the one part and _____ _____ _____ _____[name and address of contractor] (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute _____ _____[name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:
   i) Letter of Acceptance;
   ii) Notice to proceed with the works;
   iii) Contractor's Tender;
   iv) Contract Data;
   v) Conditions of contract (including Special Conditions of Contract);
   vi) Specifications;

vii) Drawings;
viii) Bill of Quantities; and
ix) Any other document listed in the Contract Data as forming part of the contract.

Whereas, the parties now mutually agree to the following conditions of Contract.

5. Jurisdiction of Courts/Arbitration: The Sitting of arbitration shall be held at Bangalore only and nowhere else.
6. Dispute of any kind arising out of the contract shall be resolved within the jurisdiction of Bangalore city only and the parties agree and clearly understand that the courts/ tribunals situated at Bangalore Metropolitan City have exclusive jurisdiction for the redressal of the disputes arising out of the contract and at no other place.
7. The parties further agree and understand that the place or places of issue of bank guarantee other than Bangalore will have no jurisdiction to resolve dispute of any kind relating to enforcement of the bank guarantees submitted by the contractor at Bangalore for the execution of the contract at Bangalore.
8. The contractor shall comply with all the legal requirements in the matter of employment of workmen and provide all safety gadgets to the workmen while working in the hazards place of conditions during the execution of the contract.
9. Contractor shall be fully responsible in the event of death of employee/ workman during the execution of the work and liable to pay adequate compensation to the dependants of employee/ workman as per law.
10. On his/ their failure, if the Board is made to pay compensation the same shall be recovered by the Board from the contractor out of the amounts due to the contractor or by appropriate legal action.
11. If death of any employees occurs during execution of work due to negligence of contractor, the contract will be liable for termination.
12. In the event of such termination, the employer may consider blacklisting of firm after due notice.
13. In case of any death or accident the contract will be cancelled after following due process.

14. The Board will be entitled to claim exemplary damages from the contractor in case of death of any work man / employees of the contractor in any of the BWSSB works as it damages the reputation of

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____
was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____
in the presence of:

Binding Signature of Employer _____

Binding Signature of Contractor _____

SECTION 5: CONDITIONS OF CONTRACT

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Conditions of Contract

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Bold letters are used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Tender.

Compensation events are those defined in Clause 38 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Employer in accordance with Sub Clause 46.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.2 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Tender to carry out the Works has been accepted by the Employer.

The **Contractor's Tender** is the completed Tender document submitted by the Contractor to the Employer.

The **Contract price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; months are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects liability period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Employer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The **Site** is the area defined as such in the Contract Data.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Employer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

A **Variation** is an instruction given by the Employer which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Employer will provide instructions clarifying queries about the Conditions of Contract.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement
(2) Letter of Acceptance, notice to proceed with the works
(3) Contract Data
(4) Conditions of Contract
(5) Specifications
(6) Drawings
(7) Bill of quantities and
(8) Contractor’s Tender
(9) any other document listed in the Contract Data as forming part of the Contract.

3. Law governing contract

3.1 The law governing the Contract is the Laws of India supplanted by the Karnataka Local Acts.

4. Employer's decisions

4.1 Except where otherwise specifically stated, the Employer will decide contractual matters between the Employer and the Contractor.

5. Delegation

5.1 The Employer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Employer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer.

9. Personnel

9.1 The Contractor shall employ the technical personnel (of number and qualifications) as may be stipulated by GOK from time to time during the execution of the work. The technical staff so employed shall be available at site as may be stipulated by the Employer.

9.2 If the Employer asks the Contractor to remove a person who is a member of the Contractor’s staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer’s and Contractor's risks

10.1 The Employer carries the risks which this Contract states are Employer’s risks, and the Contractor carries the risks which this Contract states are Contractor’s risks.

11. Employer's risks

11.1 The Employer is responsible for the excepted risks which are:

(a) Rebellion, riot commotion or disorder unless solely restricted to employees of the Contractor or his Sub-Contractors arising from the conduct of the Works; or

(b) A cause due solely to the design of the Works, other than the Contractor’s design; or

(c) any operation of the forces of nature (in so far as it occurs on the Site) which an experienced contractor:

(i) could not have reasonably foreseen; or

(ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures;
(A) prevent loss or damage to physical property from occurring by taking appropriate measures or
(B) insure against such loss or damage

12. Contractor's risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Insurance:

13.1 The Contractor shall prior to commencing the works, effect and thereafter maintain insurances , in the joint names of the Employer and the Contractor, (cover from the first working day after the Start Date to the end of Defects Liability Period), in the amounts stated in the Contract Data :
(a) for loss of or damage to the Works, Plants and Materials and the Contractor's equipment;
(b) for liability of both Parties for loss, damage, death and injury to third parties or their property arising out of the Contractor's performance of the Contract including the Contractor's liability for damage to the Employer's property other than the Works and
(c) for liability of both Parties and of any Employer's representative for death and injury to the Contractor's personnel except to the extent that liability arises from the negligence of the Employer, any Employer's representative or their Employees.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Employer for his approval before the Start Date. All such insurance shall provide for compensation to be payable to rectify the loss or damage incurred. All payments received from insurers relating to loss or damage shall be held jointly by the Parties and used for the repair of the loss or damage or as compensation for loss or damage that is not to be repaired.

13.3 If the Contractor fails to effect or keep in force any of the insurances referred to in the previous sub-clauses or fails to provide satisfactory evidence, policies or receipts, the Employer may without prejudice to any other right or remedy, effect insurance for the cover relevant to such default and pay the premiums due and recover the same as a deduction from any other monies due to the Contractor. If no payments is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Employer.

13.5 Both Parties shall comply with any conditions of the insurance policies.

14. Site Investigation Reports:

14.1 The Contractor, in preparing the tender, shall rely on any site investigation reports referred to in the Contract data, supplemented by any information available to the Tenderer.

15. Queries about the Contract Data

15.1 The Employer will clarify queries on the Contract Data.

16. Contractor to construct the Works

16.1 The Contractor shall construct the Works in accordance with the Specification and Drawings.

17. The Works to be completed by the Intended Completion Date

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Employer, and complete them by the Intended Completion Date.

18. Approval by the Employer:

18.1 The Contractor shall submit Specification and drawings showing the proposed Temporary Works to the Employer, who is to approve them if they comply with the Specifications and Drawings.

18.2 The Contractor shall be responsible for the design of Temporary Works

18.3 The Employer’s approval shall not alter the Contractor’s responsibility for design of the Temporary Works.

18.4 The Contractor shall obtain approval of third parties to the design of third parties to the design of the temporary Works where required.

18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Employer before their use.

19. Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries

20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Employer of such discoveries and carry out the Employer's instructions for dealing with them.

21. Possession of the Site

21.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

22. Access to the Site

22.1 The Contractor shall allow the Employer and any person authorized by the Employer access to the Site, to any place where work in

connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

23. Instructions

23.1 The Contractor shall carry out all instructions of the Employer which comply with the applicable laws where the Site is located.

24. Procedure for resolution of Disputes:

24.1 If the Contractor is not satisfied with the decision taken by the Employer, the dispute shall be referred by either party to Arbitration within 30 days of the notification of the Employer's decision.

24.2 If neither party refers the dispute to Arbitration within the above 30 days, the Employer's decision will be final and binding.

24.3 The Arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

B. Time Control

25. Program

25.1 Within the time stated in the Contract Data the Contractor shall submit to the Employer for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works.

25.2 The Employer's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Employer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

26. Extension of the Intended Completion Date

26.1 The Employer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date.

26.2 The Employer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Employer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information.

27. Delays ordered by the Employer

27.1 The Employer may instruct the Contractor to delay the start or progress of any activity within the Works.

28. Management meetings

28.1 The Employer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the progress achieved and the plans for remaining work.

28.2 The responsibility of the parties for actions to be taken is to be decided by the Employer either at the management meeting or after the management meeting and stated in writing to be distributed to all who attended the meeting.

C. Quality Control

29. Identifying defects

29.1 The Employer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Employer may instruct the Contractor to search for a Defect and to uncover and test any work that the Employer considers may have a Defect

30. Tests

30.1 If the Employer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

31. Correction of defects

31.1 The Employer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

31.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Employer’s notice.

32. Uncorrected defects

32.1 If the Contractor has not corrected a Defect within the time specified in the Employer’s notice, the Employer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

1

2 D. Cost Control

33. Bill of Quantities (BOQ)

33.1 The BOQ shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.

33.2 The BOQ is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the BOQ for each item

34. Variations

34.1 The Employer shall have power to order the Contractor to do any or all of the following as considered necessary or advisable during the progress of the work by him

(a) Increase or decrease of any item of work included in the Bill of Quantities (BOQ);
(b) Omit any item of work;
(c) Change the character or quality or kind of any item of work;
(d) Change the levels, lines, positions and dimensions of any part of the work;
(e) Execute additional items of work of any kind necessary for the completion of the works; and
(f) Change in any specified sequence, methods or timing of construction of any part of the work.

34.2 The Contractor shall be bound to carry out the work in accordance with any instructions in this connection, which may be given to him in writing by the Employer and such alteration shall not vitiate or invalidate the contract.

34.3 Variations shall not be made by the Contractor without an order in writing by the Employer, provided that no order in writing shall be required for increase or decrease in the quantity of an item appearing in the BOQ so long as the work executed conforms to the approved drawings.

34.4 The Contractor shall promptly request in writing the Employer to confirm verbal orders and if no such confirmation is received within 15days of request, it shall be deemed to be an order in writing by the Employer.

35. Payments for Variations

35.1 Payment for increase in the quantities of an item in the BOQ up to 25% of that provided in the Bill of Quantities shall be made at the rates quoted by the Contractor.

35.2 For quantities in excess of 125% of the tendered quantity of an item as given in the BOQ, the Contractor shall be paid at the rate entered in or derived from in the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract.

35.3 If there is no rate for the additional, substituted or altered item of the work in the BOQ, efforts would be made to derive the rates from those given in the BOQ or the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) and if found feasible the payment would be made at the derived rate for the item plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract

35.4 If the rates for additional, substituted or altered item of work cannot be determined either as at 35.1 or 35.2 or 35.3 above, the Contractor shall be requested to submit his quotation for the items supported by analysis of the rate or rates claimed, within 7 days.

35.5 If the Contractor's quotation is determined unreasonable, the Employer may order the Variation and make a change to the Contract Price which shall be based on Employer's own forecast of the effects of the Variation on the Contractor's costs.

35.6 If the Employer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

35.7 Under no circumstances the Contractor shall suspend the work on the plea of non-settlement of rates for items falling under this Clause.

36. Submission of bills for payment

36.1 The Contractor shall submit to the Employer monthly bills of the value of the work completed less the cumulative amount paid previously.

36.2 The Employer shall check the Contractor's bill and determine the value of the work executed which shall comprise of (i) value of the quantities of the items in the BOQ completed and (ii) valuation of Variations and Compensation Events.

36.3 The Employer may exclude any item paid in a previous bill or reduce the proportion of any item previously paid in the light of later information.

37. Payments

37.1 Payments shall be adjusted for deductions for advance payments, other recoveries in terms of the contract and taxes, at source, as applicable under the law. The Employer shall pay the Contractor the within **60 days** of submission of bill. The Contractor shall be liable to pay liquidated damages for shortfall in progress. For Progress beyond the agreed Programme, payment is subject to availability of the grants.

37.2 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

38. Compensation events

38.1 The following are Compensation events unless they are caused by the Contractor:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.
(b) The Employer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.
(c) The Employer instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.
(d) The Employer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
(e) The effect on the Contractor of any of the Employer's Risks.

(f) The Employer unreasonably delays issuing a Certificate of Completion.
(g) Other Compensation Events listed in the Contract Data or mentioned in the Contract.

38.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Employer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

38.3 As soon as information demonstrating the effect of each Compensation event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Employer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Employer shall adjust the Contract Price based on Employer’s own forecast. The Employer will assume that the Contractor will react competently and promptly to the event.

38.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Employer.

39. Tax

39.1 Taxes, Duties and other Levies:

a) The selected bidder will be fully responsible for all applicable taxes, duties, license fees, etc. incurred in relation to the work. They must cover the taxes that may be imposed on their own personnel or any of their employees' earnings and will be expected to protect the employer from any potential claims made against them. The selected bidder must indemnify and hold the employer harmless against any such claims.

a) According to Commercial Tax Department Notification No.12/2017, all services are subject to a nil rate of GST under the definition of a pure service. The quoted rate should exclude the GST, which will be charged separately as per the prevailing applicable laws.

c) BWSSB does not assume any responsibility for taxes under the Indian Income Tax Act, 1961 for the selected bidder(s) or their personnel. In accordance with the provisions of the Indian Income Tax Act, 1961, if necessary, BWSSB will make deductions for Income Tax at source. The applicable tax at the prevailing rate will be included over and above the quoted price

If the Amount put to tender is exclusive of GST

GST and TDS Clause:

Prevailing GST:

The prevailing Goods and Services Tax (GST) rate is 18% as per the current taxation regulations. The GST amount is not included in the bid amount put forward by the bidder but will be applicable in addition to the awarded contract cost.

TDS Deduction:

As per the GST notification, a Tax Deducted at Source (TDS) of 2% shall be deducted by the client while making payments for the bills raised by the bidder.

Submission of Security Deposit:

Upon issuance of the Letter of Award (LOA) at the award cost, including GST, the successful bidder shall be required to submit the entire security deposit, comprising the applicable GST amount as well.

Invoicing and Tax Compliance:

The successful bidder shall adhere to all relevant GST regulations and guidelines while invoicing for the work contract. The invoice/bills provided by the bidder should clearly indicate the applicable GST rate, along with the tax registration details, and comply with all legal requirements as specified by the GST authorities.

Changes in GST Rate:

In the event of any change in the GST rate during the execution of the contract, the responsibility of updating the invoicing and pricing structure to reflect the revised GST rate shall lie with the bidder. The contract shall remain in force, and both parties shall abide by the new GST rate as per the applicable law.

GST Documentation:

The bidder is required to provide all necessary GST-related documentation, such as tax invoices, payment receipts, and any other documents requested by the contracting authority, in a timely and accurate manner.

Any disputes or issues related to GST:

In case of any disputes or issues related to GST compliance, the bidder shall be responsible for resolving such matters with the appropriate tax authorities. The contracting authority shall not bear any liability for any non-compliance or discrepancies related to GST.

This provision is an integral part of the bid document, and all bidders are requested to thoroughly review and acknowledge their understanding

and compliance with the prevailing GST rate of 18% before submitting their bids.

40. Price Adjustment:

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41. Liquidated damages

41.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestone as stated in the Contract Data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

41.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Employer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment of bill.

42. DELETED

43. Securities:

43.1 The Security deposit (including additional security for unbalanced tenders) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and type of instrument acceptable to the Employer. The Security deposit shall be valid until a date 30 days from the date of expiry of Defects Liability Period and the additional security for unbalanced tenders shall be valid until a date 30 days from the date of issue of the certificate of completion.

44. Cost of Repairs:

44.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

45. Completion

45.1 The Contractor shall request the Employer to issue a Certificate of Completion of the Works and the Employer will do so upon deciding that the Work is completed.

46. Taking over

46.1 The Employer shall take over the Site and the Works within seven days of issuing a certificate of Completion.

47. Final account

47.1 The Contractor shall supply to the Employer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 90 days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer shall issue within 90 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Employer shall decide on the amount payable to the Contractor and make payment within 60 days of receiving the Contractor's revised account.

48. As built drawings and /or Operating and Maintenance Manuals

48.1 If "as built"[1] Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data.

48.2 If the Contractor does not supply the Drawings by the dates stated in the Contract Data, or they do not receive the Employer's approval, the Employer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

49. Termination

49.1 The Employer may terminate the Contract if the other party causes a fundamental breach of the Contract.

49.2 Fundamental breaches of Contract include, but shall not be limited to the following:

(a) the Contractor stops work for 45 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Employer;

(b) the Employer instructs the Contractor to delay the progress of works and the instruction is not withdrawn within 60 days;

(c) The Contractor becomes bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(d) a payment due to the Contractor is not paid by the Employer within 90 days of the date of the submission of the bill by the Contractor.

(e) the Employer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Employer;

(f) the Contractor does not maintain a security which is required;

[1] Completion Drawings

(g) the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and

(h) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract. For the purpose of this paragraph : “corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. “Fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition.”

49.3 When either party to the Contract gives notice of a breach of contract to the Employer for a cause other than those listed under Sub Clause 49.2 above, the Employer shall decide whether the breach is fundamental or not.

49.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

49.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

50. Payment upon Termination

50.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Employer shall prepare bill for the value of the work done less advance payments received up to the date of the bill, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

50.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Employer shall prepare bill for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract, and less taxes due to be deducted at source as per applicable law and make payment accordingly.

51. Property

51.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor’s default.

52. Release from performance

52.1 If the Contract is frustrated by any event entirely outside the control of either the Employer or the Contractor the Employer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

53. Successful Bidder has to follow the SWD (Solid Waste Management Rules 2016) in this tender work.

F. Special Conditions of Contract

1. Labour :

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Employer, deliver to the Employer a return in detail, in such form and at such intervals as the Employer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Employer may require.

2. Compliance with labour regulations:

During continuance of the contract, the Contractor and his sub contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, Employer shall have the right to deduct any money due to the Contractor including his amount of security deposit. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

3. Protection of Environment:

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

4. Arbitration (Clause 24)

4.1 The procedure for arbitration shall be as follows:

(a) In case of dispute or difference arising between the Employer and the Contractor relating to any matter arising out of or connected with this agreement it shall be settled in accordance with the Arbitration and Conciliation Act 1996. The disputes or differences shall be referred to a Sole Arbitrator. The Sole Arbitrator shall be appointed by agreement between the parties; failing such agreement, by the Appointing Authority (any one of the Organizations as per list enclosed in Annexure)

(b) Arbitration proceedings shall be held at ***Bangalore***, Karnataka, India

(c) The cost and expenses of arbitration proceedings will be paid as determined by the Arbitrator. However the expenses incurred by each party in connection with the preparation, presentation, etc., shall be borne by each party itself.

(d) Performance under the contract shall continue during the arbitration proceedings and payments due the Contractor by the Employer shall not be withheld, unless they are the subject matter of the arbitration proceedings.

5 Contractor to Co-ordinate his Work with Other Contractors

5.1 The Contractor has to co-ordinate with the other concerned Contractors as already specified in Conditions of Contract for all such works as per the directions of Engineer in charge at no extra cost.

6 **Continuation of Work:**

6.1 In case of the death of a contractor after executing the agreement / commencement of the work, his legal heir, if any eligible registered contractor and willing, can execute and complete the work at the accepted tender rates irrespective of the cost of the work

7. Successful Bidder has to follow the SWD(Solid Waste Management Rules 2016) in this tender work.

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Sd/-

Chief Engineer (Waste Water Management-West

SECTION 6:
CONTRACT DATA

Items marked "N/A" do not apply in this Contract.

The following documents are also part of the Contract:

- The Schedule of Operating and Maintenance Manuals
- The Methodology and Program of Construction
- Site Investigation Reports
- The Schedule of Key and Critical Equipment to be deployed on the work as per agreed program of construction.

The Employer is :

Name: Bangalore Water Supply and Sewerage Board represented by **Chief Engineer (Waste Water Management-West)**

Address: Bangalore Water Supply & Sewerage Board
6th Floor, Cauvery Bhavan D-Block,
K.G. Road, Bangalore 560009

Name of authorized Representative: Executive Engineer (WWM-STP-H&AV)
BWSSB BDA outer ring road, Opp to
Nagawara Lake, Hebbal
Bangalore 560024

The name and identification number of the Contract is : **Improvement work of Design, Construction, Supply, Erection and Commissioning 1 MLD UF, Solar Pannel & UV Disinfection at 20 MLD UWTP at Horamavu under JHA funds coming under AEE(WWM-STP-H&A.V-1) Sub-div**

The start date shall be the date of issue of notice to proceed with the work.

The Intended Completion Date for the whole of the Works is **09 Months**

Milestone Dates:

	Physical works to be completed	Period from the date of issue of notice to proceed with the work
Milestone 1	100% completion of work in all respects as per the scope of work awarded in the contract.	0-9 months

The Site possession date is the day of issue of notice to proceed with the work

The Site location is defined in drawing.

The Defects Liability Period is 365 days.

Insurance requirements are as under:

Type of Cover		Minimum Cover for Insurance
(i)	Works , Plant and materials	The sum stated in the Agreement plus 20%
(ii)	Loss or damage to equipment	Full replacement cost
(iii)	Loss or damage to property of Third Party	Full replacement cost
(iv)	Personal injury or death insurance (a) for Third Party	Rs. 20.00 Lakh
	(b) for Contractor's employees or labour	In accordance with the statutory requirements applicable to Karnataka

Price Adjustment Formula;

[40]

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The liquidated damages for the whole of the works are Rs. ***0.1%*** per day of the contract value and that for the milestones are as under:

The maximum amount of liquidated damages for the whole of the works is ***ten*** percent of final contract price.

The date by which "as-built" drawings (in scale **1:200**) in 2 sets are required is within 30 days of issue of certificate of completion of Whole or Section of the Work as the case may be.

The amount to be withheld for failing to supply "as the date required is Rs.1,00,000-00

The following events shall also be fundamental breach of the contract :

1. The contractor has contravened Sub-clause 7.1 and Clause 9 of CC.

The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the Works shall be ***30*** percent.

Sd/-

Chief Engineer (Waste Water Management-West)

SECTION 7:

TECHNICAL SPECIFICATIONS

Scope of Works with Detailed specifications

The works shall be carried out with the integration of existing Plant and its process along with PLC&SCADA system. The Contractor has to ensure that during the execution of work any damages occurs, the Contractor has to rectify the same at their own cost. The Contractor also needs to ensure that the Plant operation and treatment should not be hampered during the execution of the work. Necessary interfaces required shall be carried out by the Contractor.

1) Ultra Filtraction : Supply, Installation, Testing & Commissioning of Ultra Filltration Membrane with following Specification,

A. SUBMERGED ULTRA FILTRATION SYSTEM

Bidder shall provide submerged Ultra filtration which is a type of membrane filtration in which hydrostatic pressure forces a liquid against a semi permeable membrane. A semi permeable membrane is a thin layer of material capable of separating substances when a driving force is applied across the membrane. Ultra filtration is aimed for removal of bacteria and other microorganisms, particulate material, colloidal matters, colloidal Silica, and natural organic material, which can impart color, tastes, and odors to the water. The characteristics of filtered water from Ultra filtration shall be guaranteed by bidder as per tender.

The UF membrane shall be designed for flow and specifications given in the tender document.Bidder must tie-up with a Technology Provider for Tertiary Treatment Plant (TTP) based on submerged UF & shall submit MOU/Tie-up Agreement on stamp paper of Rs. 500 (Rs. Five hundred) as a part of their bid. Bid without MOU/Tie-up Agreement shall be summarily rejected. The technology provider or OEM shall have experience of providing submerged UF system in at least One (1) TTP of 20 MLD capacity (net output) for sewage treatment application in India during last seven year for any State / Central Government organizations / ULBs. The said TTP must be in operation for at least 2 years as on date.The technology provider or its authorised representative should have a registered office in India,with the trained manpower in process design, detailed engineering,commissioning and support during O&M period.

Submerged Ultra filtration shall consist of hollow fibers membrane material which shall be installed in RCC / prefabricated open tanks or cells. The feed water flows either inside the cells / tanks and through lumen of the fibers. Suspended solids and solutes of high molecular weight shall be retained, while water and low molecular weight solutes shall pass through the membrane.
Submerged Ultra filtration system shall consists of the following:

- UF Feed Sump and pumps (if required). Alternatively, the feed water after chlorination shall flow by gravity into the cells depending upon system design.
- Pres-Screening in the form of Automatic Self-Cleaning Basket strainer, in case of pumped flow.
- Pre- screening in the form of rotating drum screens with automatic operation, in case of gravity flow.
- Submerged Ultra-filtration Cells / Tanks fitted with membranes modules
- Filtrate Transfer pumps for withdrawal of filtrate
- Chemical dosing system along with necessary dosing tank, pumps, accessories andOnline static mixer
- Air Scour blower for backwash
- Filtrate Backwash Pump for backwash
- UF CIP and MW system
- Disposal of UF Backwash waste and Neutralized Waste
- Any other units, as required to complete the system

1. UF Feed Sump & Pumps (If required)

UF feed sump shallreceivethe secondary treated effluent/treated sewage from the upstream units. Function of this sump is to hold the incoming feed water so that it shall be pumped to the downstream UF system. UF Feed sump shall consist of sluice gates on upstream for flow regulation and system bypass. The sluice gates shall be installed such that it is possible to operate them manually, inspection as well as operation by standing on a platform constructed at a suitable elevation adjoining the UF Feed Sump. The UF Feed Sump shall be of adequate size to meet the requirements of workability inside it. The sump shall be open to sky / covered and shall be water tight to prevent seepage of the water. The entire construction is in M30 grade concrete and as per IS 3370. RCC access platform minimum 1000 mm wide with railing as per specifications shall be provided on one side of the Feed Sump. Ultrasonic Non-Contacttype Level Transmitter shall be installed for pump auto-operation.

Pumping machinery shall be designed based on incoming flow. The pumps shall be Submersible Clear water pumps with centrifugal, non-clog type design. The speed of pump shall not be more than 1500 rpm. The impeller should be of a non-clog design with smooth passage and solid handling capability of 40 mm size.

The pumps shall have automatic coupling arrangement at discharge end for removal and a guide pipe and chain in SS 304 will be provided for removal and lowering of pumps. Pump shall run smooth without undue noise and vibration. Vibration shall be limited as per BS 4675 Part I.

The motor shall be squirrel cage type, suitable for three phase supply continuous duty with class 'F' insulation. Motor shall have integral cable parts and the cable entries shall be Sealed. Complete rotor shall be balanced dynamically.

Design Flow	:	As per tender
Minimum Retention Time	:	As per UF System Down Time or 10 min at design flow
Min. No. of Pumps	:	1 Working + Min 50 % Standby
Type of Pumps	:	Submersible type non-clog design
Solid passage size	:	40 mm max.Through Pumps
Insulation	:	Class F
Protection	:	P-68
Specific gravity	:	1.05
Temperature	:	Min. 20° C
Efficiency	:	more than 70%
Installation	:	Fixed.
Casing	:	Cast Iron IS 210 Gr. FG 260
Impeller	:	SS304
Shaft	:	AISI 410
Cable gland	:	Cast Iron IS 210 Gr. FG 260
Motor Body	:	Cast Iron IS 210 Gr. FG 260
Sealed cover	:	Cast Iron IS 210 Gr. FG 260
Automatic Coupling	:	CI
Duck foot bend	:	CI
Guide Pipe	:	SS 304
Lifting chain	:	SS 304
Fasteners	:	MS with GI coating

Electrical panel of the Pumps shall be placed in such a manner to avoid corrosion from gases. Either, it can be clubbed with MCC panel or necessary protection can be given.

Electrical Hoist - comprising of I-Girder and a 1½ ton or more chain pulley (the chain pulley block capacity to be 1½ Ton or 1.5 times the maximum single unit/ weight that may be required to be removed for maintenance) with horizontal travel on the I-beam shall be provided for removing the UF Feed Pumps.

2. Basket Strainers/Filter (For pumped flow)

Min one Number of automatic self-cleaning type basket filter / strainer shall be provided at common header of UF Feed Pumps. The screening media shall have max. 1000 micron opening / perforation size. Associated equipment and

arrangement necessary for automatic cleaning and discharge of screenings shall be provided.

The automatic self-cleaning pressurized strainers (with manual override facility) for each Ultra Filtration unit shall be:

- Fitted with media containing 1000 micron (max. opening / perforation) multi-layer weave type or such suitable / equivalent screen and shall remove screenings which are greater than 1000 micron in size in any dimension.
- Capable of filtering the maximum flows of secondary treated Sewage as per design flow.
- A proven design for effective removal of debris from Sewage flows.
- Capable of operation for long periods without attention under all flow conditions.
- Operate and clean automatically and shall be with manual override facility.
- Controlled by 'pressure differential' and by 'timer' in automatic mode by plant control system. Diff. Pressure Transmitters shall be provided across each strainer for monitoring the clogging / head loss and initiate automatic back wash cycle. When the pre-set differential pressure or time reaches, self-cleaning shall begin. No interruption of flow during backwash / flushing. Flush valve / Exhaust Valve / Drain Valve for dirty water disposal to operate automatically, to open during cleaning cycle.
- Enable any gases that might accumulate in the housings of the filtration units to be vented safely.
- Shall be self-cleaning i.e. separate backwash water feed shall not be required.
- Each basket filter shall be provided with an inlet and outlet isolation valve as well as a bypass piping with valve.

Design Flow	:	As per tender
No. of Basket Filters/Strainers	:	As per design
Type :		Max. 1000-micron weave wire type or suitable re-usable filter element, automatic self-cleaning type with manual override facility. Flow Direction: Out to In
MoC	:	SS304 strainer and housing
Max. Working Pressure	:	Suitable upto 10 bar
Min Operating	:	As per design
Head Loss under Normal Operation	:	As per design
Max Head Loss	:	As per design

Cleaning Mechanism	:	Electric self-cleaning mechanism through suction nozzles spiraling across the screen / rotating scrapper mechanism. Filtered water flow to continue during backwash. Pump On & off or flow diversion during backwash of basket filter not permitted.
Backwash Quantity per Day	:	As per design
Control System	:PLC	based operation and backwash / cleaning cycle

3. Rotary Drum Screen (Perforated Type) (For Gravity Flow)

Depending upon the flow regime and upstream hydraulics, submerged ultrafiltration units shall function on influent gravity function. In such a case, Rotary drum screens shall be provided in pre-screening channels that will receive secondary treated effluent from upstream units. Min. one numbers of Mechanical Rotary Drum Screen (as Working) and one number of Mechanical Rotary Drum Screen (as Standby) shall be provided. Each Screen Channel shall be designed for 100% of Design Flow. Screen channels shall be designed in such a way that, the laminar flow condition shall be maintained in the approach channel of screens. The entire construction shall be in M30 grade reinforced cement concrete and as per IS 3370. RCC Platform / Walkway, minimum 1.20 m wide with Hand Railing as per specifications shall be provided. RCC Staircase, minimum 1.20 m wide with Hand Railing as per specifications shall be provided for access from Finished Ground Level to the top of the Unit and to the Operating Platform/Walkway.
The clear opening of perforations shall be 1 mm for the Rotary Drum Screen. Conveyor Belt and Chute arrangement shall be provided to take the screenings. Screenings dropped from Chute shall be collected in a wheel barrow. Mechanically operated CI Sluice Gates / Valves shall be provided at the upstream and downstream end to regulate the flow.

Design Flow	:	As per tender
Number of Units	:	Min. 1 Mechanical (Working) + 1 Min. Mechanical (Standby) each designed for 100% peak flow
MoC	:	SS304
Approach Velocity	:	>0.30 m/s
Velocity through Screen	:	Min 0.60 m/s – Max 1.20 m/s
Wheel barrow	:	1 No. min
Max Head Loss across screen	:	Max 0.3 m/s

All other accessories, whether specified or not, but required for completion

of Contract shall form the part of Bidder‘s Scope.

4. Submerged Ultrafiltration System

The proposed UF system shall be provided with submerged UF membrane system. Submerged UF cell/tank shall be designed for N-1 operation philosophy. The plant output shall not reduce the design flow when one cell/tank is offline during routine maintenance or cleaning. Each cell/tank shall be designed with required membrane installed. The flux selection for the design is discussed in the following table. The system shall be designed for an overall UF recovery of 93% minimum.

UF cells/tanks shall be constructed in RCC M30 grade reinforced cement concrete and as per IS 3370. RCC Platform/Walkway, minimum 1.20 m wide with Hand Railing as per specifications shall be provided. RCC Staircase, minimum 1.20 m wide with Hand Railing as per specifications shall be provided for access from Finished Ground Level to the top of the Unit & to the Operating Platform/Walkway. Suitable lifting arrangement shall be provided for lifting the racks during maintenance purpose.

The criteria for the design of Membrane Filtration system are given below:

- Daily average suspended solids (SS) in Membrane Filtration Effluent shall be below detectable limit or < 2 mg/L and turbidity shall be <0.5 NTU at all times
- Fully automatic operation including backwash and cleaning (MW, CIP, etc.)
- Minimize installed footprint and capital/operating cost
- Maximize accessibility and operability/safety

Following equipment shall be included in the Ultra-Filtration System:

- Ultra filtration membrane system will comprise of suitable Ultra Filtration units (all duty),suitable for total UF System permeate flow having min. 93% recovery.
- There will be an inlet flow control valve/gates for each cell/tank. All inlet and outlet valves for each UF cellshall be pneumatic or suitable actuator operated.
- The entire membrane modules shall be installed in Pre-Fabricated cell/tank or in RCC tank ; which shall be connected to other equipment necessary for the required operation.
- All chemical injecting valve/s to each UFcell for MW / CIP shall also be pneumatic or suitable actuator operated or as recommendedby UF vendor for fully automatic operation.
- Complete backwash system including air blowers, pumps and valves shall be provided suitable to performbackwashing of UF cells. The backwash water will be sourced from treated water tank or Filtrate Backwash tank.

- Maintenance Wash (MW) system suitable for periodic chemical cleaning of Ultra Filtration unitsshall be provided. All chemicaltanks shall be designed separately to accommodate a particular chemical (say HCl, NaOH,and Hypochlorite etc.) to be used for all different process cleaning mode. All chemical tanksand dosing system shall be housed in UF building. All chemical dosing / storage tanks shall beprovided with overflow and drain line with isolation valve with required piping up to nearbydrain, level measuring instrument, etc.
- A Clean -In Place (CIP) system shall be provided common to all units for chemical cleaning of membranes and shall include CIP- clean water transfer tanks,pumps, and all other equipment and auxiliaries to make a complete CIP system.

Instrumentation and Control

- All electrical systems integral to the equipment and necessary for smooth functioning ofthe complete membrane filtration system shall be provided.
- The instrumentation and control systems including SCADA that shall automaticallycontrol the operation of the plant with a minimum of operator intervention shall beprovided.
- Ultra filtration system of each unit shall include a continuous indirect integrity monitoringsystem. The on-line turbidity meter provided separately for each cell shall measureand record permeate turbidity at least once per minute.

Various components of submerged ultrafiltration system are as follows,

A. Filtrate System: Filtrate from the Submerged UF Unit shall be withdrawn by a filtrate pump controlled by a variable speed drive. Filtrate shall be pumped to the treated water tank.

B. Filtrate Backwash System: Part of the treated water shall be pushed through the membranes for a short time in the reverse direction to flush solids from the membrane filtration modules during Backwash cycle. Filtrate backwash pumps shall be used for this purpose and shall be installed in treated water tank.

C. Compressed Air System: Clean, dry compressed air shall be required for the operation of pneumatically actuated valves and for backwash, integrity testing and draining filtrate from the inside of the Membrane Filtration. Air compressors shall be provided for this purpose.

D. Air Blower System: In the backwash process, low pressure air shall be blown into the Rack and distributed down and into the bottom of each Membrane Filtration Module then released up into

the fibre bundle. This is the Aeration step of the backwash sequence. Air blowers shall be used for this part of the backwash process.

E. **Chemical dosing system for UF Maintenance Wash (MW) & Clean In Place (CIP System)** Chemical Dosing Tanks shall be provided for dosing of chemicals required for MW and CIP cycles. These chemicals shall be dosed in the CIP ring main using dosing pumps. UF permeate shall be used to provide clean water required for the preparation of cleaning solutions and for system rinsing. It shall be collected in CIP- Clean Water Transfer Tank and pumped into CIP ring main using CIP Clean Water Transfer Pump. Acidic waste generated during CIP and MW cycles shall be collected in neutralization pit. Neutralization transfer pumps shall pump this waste water to STP head works for further neutralization.

F. **Instrumentation and Control System :** Submerged Membrane Filtration Units shall be fitted with pressure, flow, temperature, level sensing and other instruments which are used to monitor operation of the Unit.A Programmable Automation Controller (PAC or PLC) shall control all the unit operations including those of submerged ultra-filtration units.

G. **UF- Backwash Waste Collection :** Whenthe filtrate backwash and aeration steps of the backwash sequence takes place, the solids that have been loosened from the Membrane Filtration Modules shall be drained from the Cell and shall be collected in backwash waste tank. This waste shall be pumped to inlet of STP using UF backwash waste transfer pumps.

H. **Neutralization Pit :** CIP and MW rinsing and wash shall generate chemical waste water which shall be collected in neutralization pit. Chemicals shall be dosed in the neutralization pit to neutralize the water, if required or else the waste water shall be then pumped to STP head works using Neutralized Effluent Transfer pumps.

Design Criteria for UF system

Design Flow	:	As per design
Permeate Flow	:	As per requirement
Hours of Operation	:	24 hours
No of Cells/Tanks	:	As per Membrane Supplier requirement and design for N-1 philosophy
MoC of Cells/tanks	:	RCC with anti-corrosive coating
Liquid Depth	:	<= 5.0 m

Membrane Area / Module	:	≤45 m2
Design Average Flux for N condition	:	≤ 45 LMH
Max Flux	:	≤ 55 LMH
Membrane Type	:	Submerged, Hollow Fibre, Out to In
MOC of membrane	:	PVDF (100%)
Other wetted components.		:SS316, PVC-U, Polyurethane, Polyethylene, Polyamide, EPDM
Nominal pore size of Membrane	:	0.04 µmeter
Recovery	:	Min 93 %
Maximum Total Chlorine Exposure	:	12,50,000 mg.h/L
CIPpH Range	:	2-11
Max. TMP (kPA)	:	140
Feed Temperature(°C)	:	Max 40°C

Filtrate Transfer Pumps

Capacity	:	As recommended by manufacturer
Quantity	:	1 Nos. Working per UF Cell/Tank + 1 Store Standby
Type of Pump	:	Hori. Centrifugal
Head requirement	:	As per manufacturer
Drive	:	VFD

Material of Construction

Casing	:	SS316
Impeller	:	SS316
Shaft / Shaft Sleeve	:	SS 431

Filtrate Backwash Pumps

Capacity	:	As recommended by manufacturer
Quantity	:	1 Nos. Working + 1 Standby
Type of Pump /Submersible	:	Hori. Centrifugal
Head requirement	:	As per manufacturer
Drive	:	VFD

Material of Construction

Casing	:	CI
Impeller	:	Bronze LG4
Shaft / Shaft Sleeve	:	SS 410

UF Backwash Waste Transfer Pumps

Capacity	:	As recommended by manufacturer
Quantity	:	1 Nos. Working + 1 Standby
Type of Pump	:	Submersible
Head	:	As per manufacturer requirement

Material of Construction

Casing	:	CI
Impeller	:	SS304
Shaft / Shaft Sleeve	:	SS 410

UF Backwash Waste Tank

Capacity	:	As recommended by manufacturer
Quantity	:	1 Nos
MoC	:	RCC

Neutralized Effluent Transfer Pumps

Capacity	:	As recommended by manufacturer
Quantity	:	1 Nos. Working + 1 Standby
Type of Pump	:	Submersible
Head	:	As per manufacturer requirement

Material of Construction

Casing	:	SS316
Impeller	:	SS316
Shaft / Shaft Sleeve	:	SS 431

Neutralization Pit

Capacity	:	As recommended by manufacturer
Quantity	:	1 Nos
MoC	:	RCCwith anti-corrosive coating

Air Scour Blowers

Capacity	:	As recommended by manufacturer
Quantity	:	1 Nos. Working + 1 Standby
Type	:	Rotary – Twin Lobe
Head	:	As per manufacturer requirement

Drive : VFD
MoC : CI

Chemicals dosing for CIP and MW modes (Hypochlorite, Caustic, Acid, Coagulant, etc. as applicable) Dosing Tank & Pumps

Detail **:** Type / No. of Chemicals to be as recommended by UF Vendor

No. of Dosing Tanks : Min 1 Nos. for each chemical

Capacity of each tank requirement to store chemical : As per design requirement for one week of chemical cleaning

Solution strength : As required for membrane cleaning / as recommended by UF Manufacturer

Material of Construction of Tank : HDPE / FRP /LDPE/GRP

No. of Dosing Pump : Min. 2 Nos. (1W + 1S) for each chemical / application

Capacity of Dosing Pump : As per design

Type of Pump : Diaphragm

Pressure : As required for membrane cleaning

CIP Clean Water Transfer System

No. of Tanks : 1 Nos. with heater element

Capacity of each tank requirement : As per design

Material of Construction of Tank : HDPE / FRP /LDPE/GRP

No. of CIP Clean Waste Transfer Pump : 2 Nos. (1W + 1S)

Capacity : As recommended by manufacturer

Type of Pump : Horizontal Centrifugal

Head : As per manufacturer requirement

Material of Construction

Casing : CI

Impeller : SS304

Shaft / Shaft Sleeve : SS 410

Besides the above listed chemicals if the Bidder requires an alternate or additional chemical as per UF manufacturer for the effective operation of the plant, then same shall be considered by the Bidder. Bidder shall provide

inline static mixers wherever applicable for efficient mixing of chemicals. All the dosing tanks shall be provided with slow speed agitatorswherever applicable.

The Contractor shall define the guaranteed membrane element life in the pro-rated membrane warranty. The Contractor is advised that the following criteria shall be used for the purposes of defining membrane module life:

a) Failure to meet the specified filtrate quality criteria;

b) Failure to meet specified integrity test requirements; and,

c) Failure to restore the permeability of the membrane to allow the system to achieve the specified Maintenance clean and Routine clean CIP frequency requirements at the design flow using only the duty membranes.

The Contractor shall provide all details of membrane life and pro-rata warranty life as required in the Technical Particulars required for Process Equipment and the Technical Particulars required for Equipment Performance Guarantees.

5. UF Building and MCC/Control Room

Proposed UF building shall be constructed to house the UF membranes cells and related facilities. It shall be RCC (M-25) frame structure with masonry wall.

The ultra-filtration building shall include the following as a minimum:

- The Ultra filtration equipment & cells
- MCC / LT Panels
- Control Room
- Dry chemical storage room
- Wet chemical storage Area
- Chlorine Dosing System

Adequate number of Toilets and Washbasins shall be provided separately for Men & Women. Min. 1 No. of 5000 Litre capacity tank shall be provided in UF Building with ball float assembly, and with necessary inlet and distribution piping. This tank shall supply water for process requirement like chemical solution preparation etc., and for other use. The tank shall be provided with low and high float / displacer type level switches for auto start and stop of service water pump/bore well pump such that the pump shall start when the tank is empty (water level below low level) and shall stop when the tank is full (water level above high level).

In addition, the Building shall be provided with Porch, Staircase, Passages, Wooden/Aluminium/Glass Doors / Windows/Ventilators and Safety Equipment including Sand Buckets, Fire Extinguishers and Fire Alarms etc. Adequate Flooring shall be provided in various Rooms/Areas as per requirement or as per instructions of the Engineer-in-charge. Internal & External Plaster with Painting shall be done as per instructions of the Engineer-in-charge. Plinth Protection shall be provided along the periphery as per specifications.

All the parameters specified in the tender for biological outlet and tertiary treated outlet parameters shall be possible to measure in-house within the plant laboratory.

6. Piping for UF system: Guidelines for MOC

Sr. No.	Service	Type of Flow	MOC
1.	Treated Water/ Chemical Recirculation (Common Piping for UF Filtrate Pump and CIP)	Pressurized	SS316
2.	Treated Water (UF Filtrate Pump Discharge header (not utilized for CIP))	Pressurized	SS304
3.	Treated Water (Filtrate Backwash)	Pressurized	SS304
4.	Service Water/ Clean water for CIP	Gravity / Pressurized	GI “C” Class / HDPE
5.	Chemicals	Gravity / Pressurized	SS304/HDPE/PP/ uPVC/cPVC/ suitable for the chemical to be dosed
6.	Waste Water / UF Backwash Waste	Pressurized /Gravity	CI Class “LA” / DI K-9/HDPE
7.	Air Lines	Pressurized	Nylon/HDPE/GI/MS

8. Valve for UF system: Guide Line

Sr. No.	Service	Type	MOC	End Connection
A	**Sewage / Sludge**			
1.	Gravity / Pressurized	Knife Gate	CI Body & SS 304 Gate & SS 410	Flanged/ Wafer

			Spindle	
2.	Delivery of Pump	Swing Check	CS Body & SS 304 Internals	Wafer
3.	Suction & Delivery of Pump	Knife Gate	CI Body & SS 304 Gate & SS 410 Spindle	Flanged/ Wafer
B	**Service Water**			
1.	Gravity / Pressurized	Ball	CS Body & SS 304 Internals	Flanged/ Screwed
2.	Delivery of Pump	Swing Check	CS Body & SS 304 Internals	Wafer
3.	Suction & Delivery of Pump	Butterfly	CI Body & SS 304 Internals	Wafer
C	**Air**			
1.	Pressurized	Ball	CS Body & SS 304 Internals	Flanged/ Screwed
2.	Delivery of Blower	Swing Check	CS Body & SS 304 Internals	Wafer
3.	Suction & Delivery of Blower	Butterfly	CI Body & SS 304 Internals	Flanged
D	**Chemicals/ CIP Lines**			
1a	Gravity / Pressurized	Ball	As per Chemical Compatibility Chart	Flanged
1b	Gravity / Pressurized	Diaphragm	As per Chemical Compatibility Chart	Flanged
1c	Gravity / Pressurized	Plug	As per Chemical Compatibility Chart	Flanged
1d	Gravity / Pressurized	Butterfly valve	As per Chemical Compatibility Chart	Wafer

Note: Material of construction for all valves required in the UF system shall be as per good engineering practices , process requirement and UF manufacturer recommendation.

Notwithstanding the above, the Contractor shall submit a Valve Schedule with Tag No., Flow, Size, Type, and Material of Construction, End Connection etc. with detailed P & ID for approval of the Engineer-in-charge prior to any further engineering or procurement/fabrication and installation.

2. Solar Pannel :

Supply of 15 KW*5 Set solar power panels Solar panels - In order to generate electricity through sun rays/solar. Solar panels to be

installing on terrace or in open ground inside the plant premises and generated electricity and be stored and utilized in the plant (at Jakkur MLD Plant) Solar PV Module 15 KWp - 1 Nos including erection, transportation and incl of all.

3. UV Disinfection System

All materials, equipment and appurtenances required to provide an closed pipe, pumped flow, low pressure high output (LPHO) (UV) disinfection system complete with an automatic chemical/mechanical cleaning system and variable output lamp drivers. The UV system shall be complete and operational with all control equipment and accessories as shown and specified herein. This system shall be capable of disinfecting effluent to meet the effluent water quality standards.

Design Flow : Average Flow or max outlet flow from secondary treatment whichever is higher

Number of Units : 1 No.

Performance Requirements:

Provide a UV disinfection system complete with UV Banks and automatic lifting mechanism or EOT Crane as applicable, System Control Center, Power Distribution Centers if applicable, and Motorized Weir Gate / Other suitable mechanisms as Water Level Controller(s). The ultraviolet disinfection system effluent quality performance shall be evaluated through grab samples taken in accordance with the Microbiology Sampling Techniques found in Standard Methods for the Examination of Water and Wastewater, 21st Ed.

The UV system shall be designed to deliver a minimum MS2 RED of 80 mJ/cm2 at max. flow, in effluent with a UV Transmission of maximum 60%, at end of lamp life (EOLL) after reductions for quartz sleeve fouling to achieve the reuse effluent quality of < 2 MPN/100 ml on 95%ile basis (Below Detect Limit).

The RED shall be adjusted using an end of lamp life factor of 0.5 to compensate for lamp output reduction over the time period corresponding to the manufacturer’s lamp warranty. The use of a higher lamp aging factor shall be considered only upon review and approval of independent third party verified data that has been collected and analysed in accordance with protocols described in the

NWRI Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse (May 2003, 2012).

The RED shall be adjusted using a quartz sleeve fouling factor of 0.8 to compensate for quartz sleeve transmission reduction due to wastewater effluent fouling. The use of a higher quartz sleeve fouling factor shall be considered only upon review and approval of independently verified data that has been collected and analysed in accordance with protocols described in the NWRI Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse (May 2003, 2012). The data recorded for the determination of the validated fouling factor must be obtained by testing in secondary wastewater effluent utilizing the same lamp, quartz sleeve and cleaning system proposed by the UV manufacturer.

All UV Bank/pipe metal components in contact with effluent shall be Type 316 stainless steel. All wiring exposed to UV light shall be Teflon™ coated.

Lamp Array Configuration:

For in-channel systems, the lamp array configuration shall be in a staggered inclined arrangement perpendicular to water flow or horizontal lamp uniform array with all lamps parallel to each other and to the flow.

The UV shall be designed for complete submersion of the UV lamps under all flow conditions including both electrodes and the full length of the lamp arc.

UV Bank (Closed pipe):

Closed pipe UV shall consist of UV lamps, quartz sleeves and an automatic suitable chemical/mechanical cleaning system mounted in a Type 316 stainless steel frame.

Each lamp shall be enclosed in its individual quartz sleeve, one end of which shall be closed and the other end sealed by a lamp end seal. To be considered as an alternate, lamp quartz sleeves that are open at both ends shall be supplied with twice the amount of specified spare seals and lamps.

The closed end of the quartz sleeve shall be held in place by a retaining O-ring. The quartz sleeve shall not come in contact with any steel in the frame.

Each UV bank shall be rated Type IP65. UV banks that are not Type IP65 rated are not acceptable.

UV Lamps:

Lamps shall be high intensity low pressure amalgam design. Lamps that are not amalgam shall not be allowed. The filament shall be significantly rugged to withstand shock and vibration. Lamp wiring shall be Teflon insulated stranded wire. Lamps shall be rated to produce zero levels of ozone. The lamp shall withstand an average of four (4) on/off cycles per day without reducing lamp life, warranty or causing any damage to the lamp.

Lamps shall be operated by electronic lamp drivers with variable output capabilities ranging from 30% to 100% of nominal power. The lamp assembly shall incorporate active filament heating to maintain a minimum lamp efficiency of 35% across varying water temperatures and between the minimum and maximum stated lamp power levels.

Lamp Plugs:

Each lamp plug shall be accessible from the top of the UV bank to facilitate lamp removal without moving the UV banks or any other components.

An integral safety interlock in the lamp plug shall prevent removal of energized lamps.

The lamp plug shall be rated Type IP65.

Lamp Drivers:

Each lamp driver shall independently power two (2) UV lamps. Failure of one lamp shall not affect operation of the other lamp.

The lamp driver shall have a power factor correction circuit to ensure minimum 98% power factor and less than 5% total harmonic distortion (THD) current at the maximum power level and nominal input voltage.

The lamp driver should be able to withstand voltage fluctuation of + 5%.

The lamp driver electrical efficiency shall be minimum 95% at the maximum power level.

A ground fault in the output circuit shall be detected and communicated as a warning to the external controls system while the corresponding lamp operates undisturbed.

The communication protocol shall be Modbus implemented on an RS485 electrical interface, or equivalent.

Quartz Sleeves:

Quartz sleeves shall be clear fused quartz circular tubing containing 99.9% silicon dioxide.

Sleeves shall have minimum UV transmittance at 254nm of 87% (1mm wall thickness).

Sleeves shall be open at one end only and domed at the other end.

Cleaning System:

An automatic suitable in-situ cleaning system shall be provided to clean the quartz sleeves using chemical/ mechanical methods. Wiping sequence shall be automatically initiated with capability for manual override.

UV system not having in-situ cleaning system shall provide offline chemical cleaning system consisting of chemical tank equipped with air blower and air grid for agitation, neutralization chemical tank and dosing pump, recirculation/transfer pumps with disposal piping as a minimum requirement as specified in Fifth Edition of Wastewater Engineering: Treatment and Resource Recovery by Metcalf &Eddy . UV system providing offline chemical cleaning shall provide minimum 50% UV Bank as standby.

The cleaning system shall also incorporate an integrated debris removal device to clear the quartz sleeves of any large solids or debris to maximize the life of the chemical/mechanical cleaning system.

The wiper on the cleaning system shall be parked out of the effluent when not in use.

The cleaning system shall be fully operational while UV lamps and modules are submerged in the effluent channel and energized.

Cleaning sequence frequency shall be field adjustable to enable optimization with effluent characteristics.

Cleaning system operation shall be remote auto (default) or remote manual.

The cleaning system shall be provided with the required solutions necessary for initial equipment testing and for equipment start-up.

The UV intensity sensor shall be cleaned utilizing the same chemical/mechanical cleaning method as that of the lamp quartz sleeves.

Effluent Level Controller - Modulating Weir Gate / Downward Opening Weir, if applicable.

Electrical:

All applicable electrical components shall be CE-listed to ensure safety standards are met.

Each UV lamp within a bank shall be powered from a Power Distribution Centre.

UV Manufacturer to supply all cabling between lamps and drivers.

Each electronic lamp driver shall power two lamps.

Power factor shall not be less than 98% leading or lagging.

Power Distribution Centre (PDC):

The Power Distribution Centres shall be installed in a temperature-controlled room.

PDC enclosure material shall be SS 304 Type 12

All Power Distribution Centers to be CE approved or equivalent.

Each PDC shall be able to electrically isolate each bank of lamp drivers and safely replace a lamp driver without de-energizing any other operating banks.

Control and Instrumentation:

1. System Control Center (SCC):

a) The monitoring, operation and control of UV System Control Center (SCC) should be through HMI screen.

b) Alarms shall be provided to indicate to plant operators that maintenance attention is required or to indicate an extreme alarm condition in which the disinfection performance may be jeopardized. The alarms shall include, but not be limited to:

i) Individual Lamp Failure

ii) Multiple Lamp Failure

iii) Low UV Intensity

iv) Bank Communication Alarm

c) Mode of operation for UV Banks can be manual, automatic or remote.

d) Elapsed time of each bank shall be recorded and displayed on the display screen when prompted.

e) The System Control Center should be connected to the main STP PLC for providing operational and alarm feedback.

2. UV Intensity Sensor:

Minimum 1 no. of intensity sensor shall be provided per UV Bank. A reference sensor shall be provided for reference check. Reference check shall be perform when the UV Bank is in working.

3. Low Level Probe:

Minimum 1 no. of electrode type low level probe shall be provided per UV channel/pipe

All other accessories, whether specified or not, but required for complete shall form part of contractors scope

PROJECT DETAILS

1.1 Background to the Project

Bangalore Water Supply and Sewerage Board (BWSSB) is the nodal agency responsible for planning and executing water supply and sewerage projects in Bengaluru. Recognizing the potential of Used Water Treatment Plants (UWTPs) to achieve water security by protecting freshwater resources and promoting a circular economy of water, the Ministry of Housing and Urban Affairs (MoHUA) has launched the “Jal Hi AMRIT” program. This initiative by GoI is aims to create “Water Secure Cities”. Further the Jal hi Amrit (JHA) aims to achieve,

- Efficient management of Sewage Treatment Plants (STPs)
- To produce a continuous supply of high-quality treated water that meets environmental standards and supports sustainable water recycling practices.
- To promote a circular economy of water by enabling reuse for various purposes like construction, industry, and irrigation.

The existing Sewage Treatment Plant (STP) at Horamavu 20 MLD capacity is based on ASP process with disinfection units. Hence, BWSSB has proposed the up-gradation and existing 20 MLD capacity Sewage Treatment Plant STP by installing following units including its Electro-Mechanical Equipment’s with associated ancillary units complete

1. Ultra Violet Disinfection Reactor - 1 MLD Design Flow
2. Ultra Filtration - 1 MLD
3. Solar Panels

1.2 Works Details for Contract Package

The proposed system under this Contract consists of up-gradation of existing ASP based STP by installing above units and all its associated Electro-Mechanical Equipment's complete to meet the outlet parameter as specified in bid document including required new civil unit and modifications as required complete.

1.3 General Scope of Work

The Scope of Work under this contract includes but is not limited to the following in relation to the up-gradation and operation and maintenance of the Works, which are to be implemented under this contract:

- Bidder to plan up-gradation/modification sequence of above works such that the existing treatment plant should be in operation during Up-gradation, accordingly bidder to coordinate with O&M contractor.

- All preparatory work including clearing, leveling of site, site grading, formation of Finished Ground Level (FGL), construction/modifications of internal roads, etc., excavation, dewatering as required and disposal of all surplus earth to a suitable location as specified/directed by Engineer.

-- All existing facilities that are to be refurbished/Dismantled/ modified/demolished to accommodate new works. The demolition civil debris shall be disposed by the contractor as per statutory requirements wherever necessary.

- Demolishing/Refurbishing shall be carried out in accordance with all applicable laws, regulations, and standards. Items, components, or materials, whether buried, exposed, submerged, or otherwise, shall not be abandoned or left on site unless explicitly specified.

- Preparation of process and hydraulic designs with layout, process flow diagram, piping and instrumentation diagram, mass balance and hydraulic flow diagram of the proposed works stipulated in scope.

- Preparation of GA Drawings, Unit Process/Equipment/Facility/Building layouts, etc. complete.

- Detailed sizing as to suit existing facilities, design, and engineering, of all treatment units, buildings, structures, and equipment (including all civil, mechanical, electrical, architectural, instrumentation, control, automation, and SCADA components).

- Submission of detailed engineering designs, drawings, calculations, and data sheets as per requirements of Bidding Document.

- Procurement, supply, installation, erection, testing and commissioning of all proposed mechanical, electrical, instrumentation, integration with existing PLC/SCADA system complete.

- Design, construction, and commissioning of all pipelines, channels wherever required or as directed by Engineer in charge.

- Listed equipment testing, commissioning, stabilization, demonstration of performance guarantee.

- Submission of Operation and Maintenance Manuals.

- Providing training services to Employer’s personnel including O&M staff.

- Restoration of all damaged roads drains, plantation and landscaping works to original condition to give pleasant environment of build out campus.

- Preparation and submission of As-Built drawings for all civil, mechanical, electrical, Instrumentation, SCADA works complete. (as applicable)

- Integration of proposed PLC system to existing main PLC based SCADA system for monitoring.

- Handing over the facilities.

- Methodology for construction/modification sequence shall be submitted for Engineers approval before start of the Up-gradation works.

Approved Vendor List

Sl. No.	**Equipment's**	**Make**
1	Ultra Violet Disinfection Reactor	M/s. Trojan Technologies M/s. Xylem Water Solutions India Pvt. Ltd. M/s. Atlantium Technologies Ltd,
2	Solar panels	M/s. SUN Automation & Solutions private limited. M/s. Linear Energy. M/s. GM Engineering Pvt Ltd
3	Ultra Filtration System	M/s. SFC Energy & Environmental M/s. Swem Water pvt ltd M/s.Nath Valley Envirotech

SECTION 8:

DRAWINGS

(Annexed in Karnataka-Public Procurement Portal separately)

SECTION 9:

BILL OF QUANTITIES

(Filled vide Karnataka Public Procurement portal under financial document through work template)

Note:

(1) Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities (refer: ITB Clause 11.2 and CC Clause 37.2).

(2) Unit rates and prices shall be quoted by the Tenderer in Indian Rupees.

(3) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by quantity, the unit rate quoted shall govern [ITT Clause 24.1 (b)]

SECTION 10:

FORMAT OF BANK GUARANTEE FOR SECURITY DEPOSIT

To: _____ [name of Employer]
_____ [address of Employer]

WHEREAS _____ [name and address of Contractor] (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ [name of Contract and brief description of Works] (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Rs._____ [amount of guarantee] [63]_Rupees_____ _____[in words], and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee][64] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until 30 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor _____
Name of Bank _____
Address _____
Date _____

[63] An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract.